2: Handy & Winne E, R-5, 4 (1920-1921)1925
OX6 Marquesas OX6

expresses clearly the four distinct parts. The slurred motif plays a most interesting part, adding grace and melodic variety to this almost monotone chant. Accompanied by both clapping and drumming, the *nato* presents a musical subject worthy of much admiration. The sustained, powerful *pu'e* (melodic figure 10) with its positive strength and fundamental expansiveness, suggests the real purpose of the old religious chants. They were not merely devotional choruses. They were in reality magic spells believed to affect nature directly in their powerful, dynamic concentration.

MELODIC FIGURES

EXPLANATION OF FIGURES

In the melodic figures reproduced on pages 32-50 the following symbols are used:

Pitch is indicated by the letters along the vertical line to the left, these letters representing the diatonic tonal progressions, as follows:

$\bar{f}, \bar{g}, \bar{a}, \bar{b}$, treble register (above middle c);
f, g, a, b, bass register (below middle c);
G, A, B, low bass register (below bass c);
½ a, one-half step above g, ½ b, one-half step above a; ½ g, one-half step above f.

Tonal duration is measured by horizontal lines as indicated at the top of each melodic figure.

Meter and accent are absolutely dependent upon the natural emphasis of the poetry itself. In the figures, a melody line which is continued unbroken to a following tone above or below indicates slurring or continuation of tone in contrast to the rather staccato and usual manner of Marquesan chanting.

7: Linton E-5 (1920-1921) 1923 OX6 Marquesas OX6

rarily at peace, and some stories indicate that visits paid by one tribe to another were not unknown. Such fetes and visits frequently ended in a general fight, but they gave an opportunity for the exchange of ideas and objects, and tended to break down any cultural differences which may have existed. Still more important factors in the establishment of cultural unity were the local industrial specialization, and the trade which certainly existed in pre-European times. At present it is difficult to determine the extent of specialization and trade. All the larger valleys, at least, were able to manufacture the objects that they used, but because of better materials, or of superior technical skill, particular valleys or islands were recognized as preëminent in the making of objects of a certain class. Thus some stone adzes were unquestionably manufactured almost everywhere in the group, but those made on the island of Ei Ao were of better material and were regularly exported. The great size of the Ei Ao workshops would seem to indicate quantity production, and it is evident that the workmen specialized in the finer and less bulky forms. Similarly the islands of Ua Huka and Ua Pou contained large deposits of rock suited to the manufacture of *popoi* pounders and exported many of these implements to other islands. The natives of Nuku Hiva knew how to manufacture a special kind of yellow paint or dye which was highly valued in the other islands, while those of Fatu Hiva were famed for their skill as carvers. There seems to have been no formal trade; there was no regular medium of exchange and even the existence of definite barter is doubtful. The transfer was in the nature of a gift exchange.

The material culture of the Marquesas as a whole was almost uniform, a fact the more remarkable in view of the dialectal differences between the Northern Division and the Southern Division of the group, and even between different tribes on the same island. The local differences which exist have been pointed out in the body of this report. The long contact between Europe and the Marquesas has resulted in the almost complete destruction of the native culture and the information obtainable regarding ancient customs and materials is often fragmentary. The use of certain objects in museum collections has been entirely forgotten and only the names of many other artifacts are remembered.

SCOPE AND ACKNOWLEDGMENTS

The scope of the present paper has been purposely restricted to an account of the material culture of the Marquesas. Certain obvious similarities and differences between the Marquesan culture and that found in other Polynesian islands have been pointed out, but a thorough comparative study has not been attempted. Detailed descriptions of the preparation of food and of the ritualistic observances accompanying the various industries have been omitted. They are discussed by my colleague, E. S. Craighill Handy (32).

7: Linton E-5 (1920-1921) 1923 OX6 Marquesas OX6

DOMESTIC IMPLEMENTS

This section deals with the artifacts, other than containers, which formed part of the equipment of a Marquesan household. The implements were for the most part used either in the collection or preparation of food.

TOOLS FOR FIRE MAKING

Fire was made in ancient times in the Marquesas by means of the fire plow, a method common to all Polynesia. The fire plow consisted of two parts, the bed and the plow (Pl. LVI, *G*.)

The favorite material for the bed was a large dry stem of the fruit cluster of the coconut palm which, being fibrous, aided in the collection and retention of dust upon which the success of the operation depended. The second best material was fau wood. The bed was not as a rule shaped, but in the better specimens its top was flattened slightly to prevent the plow from slipping during the first few strokes. A little earth was sometimes rubbed on the bed at the beginning of the operation to increase the friction.

The plow was simply a short stick, usually of fau wood, sharpened to a straight or slightly convex edge, about one-fourth of an inch wide.

In fire making two men were usually employed, one of whom held the bed firm while the other manipulated the plow (Pl. LVI, *H*).

The bed was placed upon the ground with the end toward the plowman slightly elevated. The plow was grasped in both hands, forming an angle of about 45 degrees with the bed, and was rubbed rapidly back and forth, care being taken to stop each downward stroke at exactly the same point. As the rubbing continued, a groove was formed in the bed and a small pile of wood dust collected in the lower end of this groove. The speed of the rubbing was gradually increased until both groove and plow were smoking; then, at the right instant, the point of the plow was driven slightly beyond the end of the previous strokes and buried in the dust. A spark was thus kindled and gently blown to a coal, then dumped off into tinder made from tree cotton or shredded coconut fiber. A new groove was made each time fire was to be kindled.

In spite of the introduction of matches practically all adult Marquesans can still make fire by this process, and the time required is surprisingly short. One expert individual repeatedly made fire in between 25 and 30 seconds. The process requires a perfect muscular control which is only acquired with long practise, the trick lying in stopping all the strokes at exactly the same point and lengthening the last only enough to bury the plow in the dust without scattering it.

Native informants insisted that fire was kindled in ancient times by striking sparks from two stones, but it seems probable that this process was borrowed from Europeans at such an early time that its origin has been forgotten. Fire making sets consisting of quartz crystals, a piece of steel, and a section of bamboo filled with tree cotton are still used by the poorer natives.

9: Greiner E-4 (no date) 1923 OX6 Marquesas OX6

Polynesian Decorative Designs

By Ruth H. Greiner

INTRODUCTION

121 The purpose of the present study of Polynesian decorative design is to determine the characteristics of Polynesian art, with a view of obtaining evidences of migratory movements of Pacific races.

Detailed studies have been made of the decorative designs found in the Marquesas, Hawaii, Samoa, Tonga and New Zealand—island groups selected as representative of Polynesia, and for which the collections in the Bernice P. Bishop Museum are the most complete.

128 Each distinct design is described and illustrated, but designs common to two or more localities are discussed only once. For each island group and for Polynesia as a whole, the designs recorded have been roughly classified as angular geometric, curvilinear, and naturalistic representations.

Most of the illustrations are based upon rubbings and sketches of designs in the collections of the Bernice P. Bishop Museum. Other drawings are based upon photographs and upon illustrations in published works.

It has seemed best not to isolate the design from the object which it decorates for certain designs are found to be adapted or at least limited to wood carving, others to tattooing, and still others to tapa decoration. Furthermore, the exchange of decorated objects between the peoples of two or more island groups has assisted greatly in the dissemination of designs which characterize those objects. Therefore, evidence of contact of one group with another is afforded by the comparison of decorations which are found, for example, on house posts, bowls, war clubs and tapa. For this purpose, tabulated summaries of designs and objects have been prepared for the Marquesas, Hawaii, Samoa, Tonga and New Zealand, and general comparisons made of designs from different parts of Polynesia and also for Melanesia. It will be seen that the arrangement of designs upon the surface of the objects, as well as the form of the design, is characteristic of different groups.

121 The incompleteness of this survey is freely recognised. The paper is presented as a contribution to the interesting problem of the origin, characteristics, and racial significance of Polynesian art.

12: Sullivan D-4 (no date) 1923 OX6 Marquesas OX6

DESCRIPTION OF THE MARQUESANS

While we have many verbal descriptions of the Marquesans by travelers and writers, anthropometric data are extremely rare and confined almost wholly to the cranium. Information on stature was furnished by several of the early explorers of this region, but the conclusions are not always in accord. Deniker gives the average stature of 202 men as 174.3 centimeters. The cranial length-breadth index is given by the same author as 76.4 for thirty crania. Broca's figures for the same index are 75.0 for men and 78.2 for women.

Some of the larger of our craniometric publications have described Marquesan crania. Davis described 29 of them, the German catalog 5, the Godeffroy catalog 4, Welcker 16, and Le Batard 24. Le Batard gave also the principal head measurements of 2 persons. Von Luschan also described some Marquesan skeletal material. It is apparent that the present contribution of detailed observations on 84 men and 74 women can in no sense be considered a duplication of work already done.

The results of the seriation and averages are summarized in Tables II, III, and IV. Table II is given as a gauge of the homogeneity of the series. While a series of less than 100 does not lend itself to strict statistical analysis it should show some tendency to form a normal frequency distribution for a majority of characters, if we are dealing with a homogeneous group. But such is not the case. The bimodality encountered in the Tongan series in head length, face width, bigonial diameter, face height, and face index are here repeated in a much more marked form. The bimodality, multimodality or skew distribution extends to nearly every character. In the Marquesan series stature, span, minimum frontal diameter, nasal width, ear width, cephalic, facial and nasal indices show a bimodal tendency in both sexes. The other characters are bimodal in one sex and irregular, or multimodal in the other. Only one or two characters are unimodal and regular normal curves. This feature of the series is discussed on page 163.

The Marquesans are tall, with long, wide head, a high, wide face, and a high, wide nose. All of the dimensions of the head and body are large, indicating their massive size. They are on the verge of brachycephaly. But one cannot be sure that the heads are wholly undeformed. Handy says that artificial molding of the head seems to have been universally practiced in the following way: mothers would run the hand up and back across the infant's head, pressing down with the palm and in with the fingers in a way that would tend to make the forehead more sloping, the frontal region narrower, and the back of the head somewhat elevated

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144 narrow noses, light skin and well developed beard and body hair. As yet I have not been able to establish a sufficiently large group of associated characters to warrant its discussion. It seems probable, however, that this type may account for some of the Caucasoid traits of the Polynesians. This, as well as many other phases of the Polynesian problem, needs further study in the areas in which the people are more characteristic of this type.

In a marginal area like Polynesia it is possible to find individual representatives of nearly all the races living in and around the Pacific. A study of the photographs in this and other papers on Polynesia will show that this possibility is realized to some extent in the Marquesas, Samoa, and Tonga. but to discuss them at present would be to magnify their importance. I have confined my efforts to those types whose presence could be unmistakably demonstrated in sufficient number to warrant the assumption that they had played an important part in the history or prehistory of Polynesia. I am not at all sure that I have isolated all of these elements even, in the three island groups considered here. Furthermore, it is probable that future studies may result in some modification in the characteristics I have assigned to the two main types discussed in this paper. The relative proportions of the different types given in this paper are of course tentative for it is only when it has been possible to reconstruct the various elements of the population in detail that it will be practicable to give definite estimates of their relative frequencies.

128 141 ×142 144 In order that this paper may be of greater permanent value to those who do future work in Polynesia, or who may be inclined to carry my analysis further, I have presented the data and analyses in considerable detail. The extent of this detail may discourage those whose interest is only casual from hunting for the points which may be of special interest to them. For this reason I will briefly recapitulate the points of more general interest and indicate the section of the paper in which more detail on these points can be found.

The Marquesan material when seriated shows no tendency to form normal frequency distributions. The bimodal tendency encountered in Tonga is here encountered in an extended and exaggerated degree. Nearly every character is bimodal or multimodal. The range is enormous especially in the nasal, facial and cephalic indices. (See p. 145.) This condition is emphasized by the standard deviations and coefficients of variation which are greatly in excess of those for the Samoan and Tongan data. (See p. 165.)

141 ×142 144 The Marquesans differ somewhat in their average characters from the Samoans and the Tongans. Their hair is more wavy, their skin is darker, they are more glabrous, they have more transversely placed nostrils, the *enamel rim* on the incisor teeth is less frequent, they are shorter in stature, have longer heads, their

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INDIVIDUAL RECORDS

Individual records of the Marquesans, Samoans and Tongans on which the comparative studies of this paper are based are given in the accompanying tables. The Samoan and Tongan observations and measurements were made by E. W. Gifford and W. C. McKern; the Marquesan observations and measurements, by Dr. and Mrs. E. S. Handy; and the tables were compiled by Bessie P. Sullivan. The symbols used in the tables are as follows:

KEY TO TABLES OF INDIVIDUAL RECORDS

Explanation of Tables

A catalog number
B sex
C age
D island of birth
E hair form
F incisor rim, laterals
G incisor rim, mesials
1 stature
2 head length
3 head width
4 minimum frontal diameter
5 face width, maximum
6 bigonial diameter
7 anatomical face height
8 nasal height
9 nasal width

I cephalic index
II transverse fronto-parietal index
III transverse cephalo-facial index
IV zygomatico-frontal index
V zygomatico-mandibular index
VI anatomical facial index
VII nasal index

Body of tables

Under B: m = male; f = female

Under D: Island of Birth

Samoa
1—Upolu
2—Savaii
3—Fiji

Tonga
1—Niuatopetapu
2—Niuafoou
3—Vavau
4—Haapai
5—Tongatabu
6—Eua

Marquesas
1—Nuku Hiva
2—Ua Huku
3—Ua Pou
4—Hiva Oa
5—Tahu Ata
6—Fatu Hiva

Under E: hair form
1—straight
2—low waves
3—deep waves
4—curly
5—frizzly
6—woolly

Under F and G: enamel rim on incisor teeth
0—absent
1—slight
2—medium
3—marked

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EXPLANATION OF PLATES

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The catalog numbers of the individuals illustrated are here given. By referring to the Appendix complete details as to stature, cephalic, facial, and nasal indices, and other measurements may be obtained.

PLATE I—POLYNESIAN MEN

1—No. 16
2—No. 100
3—No. 137
4—No. 128 Chief
5—No. 143
6—No. 158
7—No. 104
8—No. 88
9—No. 146
10—No. 184
11—No. 58
12—No. 194
13—No. 88
14—No. 146
15—No. 40

PLATE II—MEN WITH A LARGE INDONESIAN ELEMENT

1—No. 28 marked incisor rim
2—No. 5
3—No. 2
4—No. 11
5—No. 27 part-Hawaiian
6—No. 9
7—No. 42
8—No. 55
9—No. 11
10—No. 28
11—No. 42
12—No. 55
13—No. 9
14—No. 27
15—No. 2

PLATE III—POLYNESIAN WOMEN

1—No. 126
2—No. 110—part-Hawaiian
3—No. 7
4—No. 145
5—No. 81
6—No. 182 marked incisor rim
7—No. 180
8—No. 148
9—No. 172 marked incisor rim
10—No. 15
11—No. 151
12—No. 196
13—No. 192
14—No. 60
15—No. 139

PLATE IV—WOMEN WITH A LARGE INDONESIAN ELEMENT

1—No. 50
2—No. 44
3—No. 3 part-Hawaiian
4—No. 38
5—No. 51
6—No. 1
7—No. 22
8—No. 6
9—No. 47
10—No. 21 frizzly hair, but cephalic index 88.2
11—No. 44
12—No. 50
13—No. 35
14—No. 6
15—No. 51

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PLATE V—MIXED AND UNCLASSIFIED TYPES

1—No. 102
2—No. 161
3—No. 26
4—No. 48
5—No. 13
6—No. 59 } long heads, high faces,
7—No. 49 } and broad noses
8—No. 153
9—No. 23
10—No. 54
11—No. 152
12—No. 31
13—No. 116
14—No. 29
15—No. 14

PLATE VI—TYPES MIXED WITH CAUCASIANS AND ASIATICS

1—one-half Chinese
2—one-half Chinese
3—part-Chinese
4—part-Chinese
5—one-half Chinese
6—one-half Chinese
7- one-half Chinese
8-one-half Chinese
9-one half Chinese
10—one-half Chinese
11—one-quarter white,
one-quarter Tahitian
12—one-quarter white
one-quarter Tahitian
13—one-half English
14—
15—one-quarter Spanish
one-quarter French

ERRATA

In "Marquesan Somatology," by Louis R. Sullivan, B. P. Bishop Mus. Mem., Vol. IX, number 2, 1923. Plates XXXVI-XLI should read "Volume IX" instead of "Volume VIII."

[Errata have been noted on plates —Analyst]